Refine Search

Search Results -

Terms	Documents
L6 and (data ADJ flow)	9

Database:
US Pre-Grant Publication Full-Text Database
US Patents Full-Text Database
US OCR Full-Text Database
EPO Abstracts Database
JPO Abstracts Database
Derwent World Patents Index
IBM Technical Disclosure Bulletins

Search: L9

Refine Search | Recall Text | Clear | Interrupt

Search History

DATE: Sunday, September 26, 2004 Printable Copy Create Case

Set Name side by side	Query	Hit Count	Set Name result set
DB=USPT; PLUR=NO; OP=OR			
L9	L6 and (data ADJ flow)	9	L9
L8	L6 AND DFD	0	L8
L7	L6 and (data ADJ flow) OR DFD	424	L7
L6	(ER ADJ diagram) OR (ER-Diagram) OR (entity-Relation ADJ diagram) OR (entity ADJ relation ADJ diagram)	35	L6
L5	L4 and (object ADJ diagram)	1	L5
L4	L3 and meta	16	L4
L3	L2 and relationship	60	L3
L2	L1 and association	85	L2
L1	717/103.ccls. or 717/108.ccls.	269	L1

END OF SEARCH HISTORY

Print Selection

Select All | Clear | Cancel | Print | Print First Page

Section: Page(s): Print Copy: 1

Select?	Document ID	Section(s)	Page(s)	# Pages to print	Database
☑	5487135	all	all	N/A	USPT
☑	5469539	all	all	N/A	USPT
☑	6476814	all	all	N/A	USPT

Building	Room	Printer
cpk2	5d57	gbkjptr

Hit List

Clear | Generate Collection | Print | Fwd Refs | Bkwd Refs | Generate OACS

Search Results - Record(s) 1 through 9 of 9 returned.

☐ 1. Document ID: US 6754181 B1

L9: Entry 1 of 9 File: USPT Jun 22, 2004

US-PAT-NO: 6754181
DOCUMENT-IDENTIFIER: US 6754181 B1

TITLE: System and method for a directory service supporting a hybrid communication system architecture

DATE-ISSUED: June 22, 2004

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Elliott; Isaac K.	Colorado Springs	CO		
Krishnawswamy; Sridhar	Cedar Rapid	IA		

US-CL-CURRENT: 370/252; 370/352, 370/356

ABSTRACT:

Telephone calls, data and other multimedia information is routed through a hybrid network which includes transfer of information across the internet utilizing telephony routing information and internet protocol address information. A media order entry captures complete user profile information for a user. This profile information is utilized by the system throughout the media experience for routing, billing, monitoring, reporting and other media control functions. Users can manage more aspects of a network than previously possible, and control network activities from a central site. A directory service that supports a hybrid communication system architecture is provided for routing traffic over the hybrid network and the internet.

12 Claims, 191 Drawing figures
Exemplary Claim Number: 1
Number of Drawing Sheets: 133

Full | Title | Citation | Front | Review | Classification | Date | Reference | Claims | KWMC | Draw De

☐ 2. Document ID: US 6731625 B1

L9: Entry 2 of 9 File: USPT May 4, 2004

US-PAT-NO: 6731625

DOCUMENT-IDENTIFIER: US 6731625 B1

TITLE: System, method and article of manufacture for a call back architecture in a hybrid network with support for internet telephony

DATE-ISSUED: May 4, 2004

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Eastep; Guido M.	McKenney	TX		
Litzenberger; Paul	Wilie	TX		
Orebaugh; Shannon R.	Herndon	VA		

US-CL-CURRENT: 370/352; 370/389, 370/392, 379/114.01, 379/90.01, 379/93.07

ABSTRACT:

A callback system is created utilizing a hybrid telecommunication system including a switched communication network and a packet transmission network. A call parameter database is stored in a memory. A call is received on the system. The call parameter database is accessed to determine at least one call parameter. The call is routed over the switched communication network and the packet transmission network based on the at least one call parameter. A plurality of service engines is provided, each configured to execute desired service logic utilizing expert system.

39 Claims, 188 Drawing figures
Exemplary Claim Number: 1
Number of Drawing Sheets: 187

☑ 3. Document ID: US 6476814 B1

L9: Entry 3 of 9 File: USPT Nov 5, 2002

US-PAT-NO: 6476814
DOCUMENT-IDENTIFIER: US 6476814 B1

TITLE: Display structure for representation of complex systems

DATE-ISSUED: November 5, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Garvey; Robert B.	Lake Lotawana	MO		

US-CL-CURRENT: 345/440

ABSTRACT:

A multi-dimensional outline, a wordgraph, represents a subset of a directed graph with a given starting node where all edges related to a node in one direction,

either incident out of that node or incident into that node appear indented below that node as in outlining represented by their terminal node or initial node respectively and all edges related in the other direction appear indented above that node represented by their initial node or terminal node, respectively, with the initial nodes and terminal nodes distinguished.

10 Claims, 2 Drawing figures
Exemplary Claim Number: 1
Number of Drawing Sheets: 2

Full | Title | Citation | Front | Review | Classification | Date | Reference | Claims | KWMC | Draw De

---

☐ 4. Document ID: US 6335927 B1

L9: Entry 4 of 9 File: USPT Jan 1, 2002

US-PAT-NO: 6335927
DOCUMENT-IDENTIFIER: US 6335927 B1

TITLE: System and method for providing requested quality of service in a hybrid network

DATE-ISSUED: January 1, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Elliott; Isaac K.	Colorado Springs	CO		
Reynolds; Tim E.	Iowa City	IA		
Krishnaswamy; Sridhar	Cedar Rapid	IA		

US-CL-CURRENT: 370/352

ABSTRACT:

Telephone calls, data and other multimedia information is routed through a hybrid network which includes transfer of information across the internet. A media order entry captures complete user profile information for a user. This profile information is utilized by the system throughout the media experience for routing, billing, monitoring, reporting and other media control functions. Users can manage more aspects of a network than previously possible, and control network activities from a central site. The hybrid network also contains logic for responding to requests for quality of service and reserving the resources to provide the requested services.

16 Claims, 191 Drawing figures
Exemplary Claim Number: 1
Number of Drawing Sheets: 133

Full | Title | Citation | Front | Review | Classification | Date | Reference | Claims | KWMC | Draw De

---

☐ 5. Document ID: US 5999525 A

L9: Entry 5 of 9 File: USPT Dec 7, 1999

US-PAT-NO: 5999525
DOCUMENT-IDENTIFIER: US 5999525 A

TITLE: Method for video telephony over a hybrid network

DATE-ISSUED: December 7, 1999

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Krishnaswamy; Sridhar	Cedar Rapids	IA		
Elliott; Isaac K.	Colorado Springs	CO		
Reynolds; Tim E.	Iowa City	IA		
Forgy; Glen A.	Iowa City	IA		
Solbrig; Erin M.	Cedar Rapids	IA		

US-CL-CURRENT: 370/352; 370/389, 370/392, 379/114.15, 379/90.01, 379/93.07

ABSTRACT:

Telephone calls, data and other multimedia information including video, audio and data is routed through a switched network which includes transfer of information across the internet. Users can transmit video, audio and data communications of designated quality over the internet to other registered video telephony users. Users can manage more aspects of a network than previously possible, and control network activities from a central site.

30 Claims, 190 Drawing figures
Exemplary Claim Number: 11
Number of Drawing Sheets: 134

Full | Title | Citation | Front | Review | Classification | Date | Reference | Claims | KWIC | Draw De

☐ 6. Document ID: US 5867495 A

L9: Entry 6 of 9 File: USPT Feb 2, 1999

US-PAT-NO: 5867495
DOCUMENT-IDENTIFIER: US 5867495 A

TITLE: System, method and article of manufacture for communications utilizing calling, plans in a hybrid network

DATE-ISSUED: February 2, 1999

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Elliott; Isaac K.	Colorado Springs	CO		

Krishnaswamy; Sridhar Cedar Rapids IA

US-CL-CURRENT: 370/352; 370/389, 370/392, 379/11, 379/115.01, 379/90.01, 379/93.07

ABSTRACT:

Telephone calls, data and other multimedia information is routed through a hybrid network which includes transfer of information across the internet utilizing telephony routing information and internet protocol address information. A media order entry captures complete user profile information for a user. This profile information is utilized by the system throughout the media experience for routing, billing, monitoring, reporting and other media control functions. Users can manage more aspects of a network than previously possible, and control network activities from a central site. Calling card access is provided for users and supports typical calls as well as media transfers over the hybrid network including over the internet.

27 Claims, 190 Drawing figures
Exemplary Claim Number: 19
Number of Drawing Sheets: 132

☐ 7. Document ID: US 5867494 A

L9: Entry 7 of 9 File: USPT Feb 2, 1999

US-PAT-NO: 5867494
DOCUMENT-IDENTIFIER: US 5867494 A

TITLE: System, method and article of manufacture with integrated video conferencing billing in a communication system architecture

DATE-ISSUED: February 2, 1999

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Krishnaswamy; Sridhar	Cedar Rapids	IA		
Elliott; Isaac K.	Colorado Springs	CO		
Reynolds; Tim E.	Iowa City	IA		
Forgy; Glen A.	Iowa City	IA		
Solbrig; Erin M.	Cedar Rapids	IA		

US-CL-CURRENT: 370/352; 370/389, 370/392, 379/114.15, 379/90.01, 379/93.07

ABSTRACT:

Telephone calls, data and other multimedia information including video, audio and data is routed through a switched network which includes transfer of information across the internet. Users can participate in video conference calls in which each participant can simultaneously view the video from each other participant and hear the mixed audio from all participants. Users can also share data and documents with

other video conference participants. Users can manage more aspects of a network than previously possible, and control network activities from a central site. Billing of the conference call is accomplished utilizing a billing detail record to capture events associated with a call as they occur and debit the appropriate bill.

20 Claims, 192 Drawing figures
Exemplary Claim Number: 7
Number of Drawing Sheets: 134

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWMC | Draw Ds

☑ 8. Document ID: US 5487135 A

L9: Entry 8 of 9 File: USPT Jan 23, 1996

US-PAT-NO: 5487135
DOCUMENT-IDENTIFIER: US 5487135 A

TITLE: Rule acquisition in knowledge based systems

DATE-ISSUED: January 23, 1996

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Freeman; Paul R. W.	Southville Bristol			GB2

US-CL-CURRENT: 706/59

ABSTRACT:

A rule-based system, concerned with a domain of knowledge or operations (the domain theory) and having associated therewith a rule-based entity relationship (ER) system (the ER theory) which represents the domain theory diagrammatically, is supported by a computer system. The system, which constructs a new rule for the domain theory, controls the entry into conditions storage memory or note pad (16) of conditions which together represent the desired rule, and rule assembly logic (17) that generates the desired rule from those entries. A display device (14) displays an ER diagram (FIG. 2) obtained from the ER theory and stored in memory (11, 12). An operator selects, via a mouse and control logic (13, 15), elements of the ER diagram. These elements are entered into the conditions storage means or note pad (16). Attributes are entered via a combination of selection from the ER diagram and semantic constraints on their values. When all elements and attributes have been so entered, they are compiled into the new rule by rule assembly logic (17) and assimilated into the domain theory by assimilator logic (18).

15 Claims, 9 Drawing figures
Exemplary Claim Number: 8
Number of Drawing Sheets: 8

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWMC | Draw Ds

☑ 9. Document ID: US 5469539 A

L9: Entry 9 of 9 File: USPT Nov 21, 1995

US-PAT-NO: 5469539
DOCUMENT-IDENTIFIER: US 5469539 A

TITLE: Method for abstracting/detailing structuring elements of system specification information

DATE-ISSUED: November 21, 1995

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Usuda; Yutaka	Yokohama			JP

US-CL-CURRENT: 345/841; 345/440, 345/853

ABSTRACT:

The specification abstracting-detailing system stores system specification information in a hierarchical structure. A hierarchy operation selects an object to be detailed or abstracted from the specification information, for updating hierarchical information of a hierarchy between specification information of the hierarchy in such a state that a logical relation of the specification information contained in the hierarchy of the object selected, and for creating or deleting a new hierarchy. This allows the abstracting and detailing to be performed in the course of a natural thinking process by a designer.

1 Claims, 12 Drawing figures
Exemplary Claim Number: 1
Number of Drawing Sheets: 11

Terms	Documents
L6 and (data ADJ flow)	9

Term used **ssadm** Found **30** of **142,983**

Sort results by: relevance
Display results: expanded form
Save results to a Binder
Search Tips
Open results in a new window

Try an Advanced Search
Try this search in The ACM Guide

Results 21 - 30 of 30 Result page: previous 1 **2**

Relevance scale

21 Trusted system design and management: Security concerns for contemporary development practices: a case study
T. Tryfonas, E. Kiountouzis
June 2001 **Proceedings of the 16th international conference on Information security: Trusted information: the new decade challenge**
Additional Information: full citation, abstract, references, index terms

This paper presents a case of application of an interpretive framework, which intends to formally integrate information systems security concerns within the information system's lifecycle. Aspects that are not normally taken under consideration, such as the involved stakeholders, the development approach and their implication to security issues, are introduced in such a way to benefit and empower the IS security design process. In the case presented here, the framework is used to extract a power ...

Keywords: action research, contemporary IS development approaches, information systems security design, information systems security practices

22 Specification and modeling: an academic perspective
Manfred Broy
July 2001 **Proceedings of the 23rd international conference on Software engineering**
Full text available: pdf(63.39 KB) Additional Information: full citation, abstract, index terms
Publisher Site

The specification and modeling of software systems, of their aspects, and their development processes is at the heart of software engineering. Over the years, we have achieved a much deeper and more comprehensive understanding of software and its models as a basis for its specification. However, there is still a way to go to make sure that all we know right now is transferred into practice, and that all we do not understand so far is investigated in depth. The goal is a tractable scientifi ...

***Keywords**: modeling, quality assurance, requirements engineering, specification, tool support*

23 Adoption of IS development methods across cultural boundaries
Gezinus J. Hidding
December 1998 **Proceedings of the international conference on Information systems**

Full text available: pdf(21.81 KB) Additional Information: full citation, references, index terms

Keywords: cultural differences, empirical research, globalization, managerial control, organizational procedures, social science

24 An empirically-grounded framework for the information systems development process
Brian Fitzgerald
December 1998 **Proceedings of the international conference on Information systems**
Full text available: pdf(54.94 KB) Additional Information: full citation, references, index terms

Keywords: IS development approaches, IS development methodologies, information systems, information systems development, pluralist research

25 Dynamics of process models in PML
R. A. Snowdon, Clive Roberts
October 1990 **Proceedings of the 5th international software process workshop on Experience with software process models**
Full text available: pdf(146.90 KB) Additional Information: full citation, abstract, references, index terms

The IPSE 2.5 project is concerned with the problem of how computer systems can be used in the development of information systems. The project is being carried out under the UK Alvey Programme Software Engineering Strategy by a consortium comprising STC Technology Limited, International Computers Limited, University of Manchester, Dowty Defense and Air Systems Limited, SERC Rutherford Appleton Laboratories, Plessey Research Roke Manor Ltd. and British Gas plc. Praxis Systems has w ...

26 Guilty or not guilty? human factors structured methods on trial
John Long, Simon Hakiel, Leela Damodoran, Bill Hefley, Kee Yong Lim
April 1994 **Conference companion on Human factors in computing systems**
Full text available: pdf(261.87 KB) Additional Information: full citation

27 Requirements rationales: integrating approaches to requirement analysis
Alistair Sutcliffe
August 1995 **Proceedings of the conference on Designing interactive systems: processes, practices, methods, & techniques**
Full text available: pdf(999.72 KB) Additional Information: full citation, references, citings, index terms

28 Methods, models and architectures for graphical user interface design: IFIP working groups 13.2/2.7 joint workshop, Loughborough, UK, September 1994
Alistair Sutcliffe, Len Bass, Gilbert Cockton, Andrew Monk, Ian Newman
October 1995 **ACM SIGCHI Bulletin**, Volume 27 Issue 4
Full text available: pdf(436.17 KB) Additional Information: full citation, index terms

29 Development of an OO infrastructure for mainframe database applications

Darryl James Rothering

October 1994 **ACM SIGPLAN Notices , Proceedings of the ninth annual conference on Object-oriented programming systems, language, and applications**, Volume 29 Issue 10

Full text available: pdf(839.77 KB) Additional Information: full citation, abstract, references, index terms

Large mainframe installations need and want to exploit the advantages of Object Technology (OT), but without totally abandoning their legacy environments. Implementing Object Orientation in such a COBOL/CICS/DB2 environment is a challenge: there is neither language support, nor development tools, nor execution infrastructure, nor testing utilities. Yet Object Orientation can be fully implemented, and a project can still meet rigorous performance requirements and tough delivery time scales. ...

30 A software assessment and certification advisor

Hans-Ludwig Hausen

April 1992 **Proceedings of the 1992 ACM annual conference on Communications**

Full text available: pdf(903.09 KB) Additional Information: full citation, abstract, references, index terms

Software assessment and certification is specified by using rules to define a product model, a process model, a characteristics model, software methods and tools. The product is divided into actual service (i.e. programs), specified service (i.e. specifications) and expected service (ie requirements). Associated to these are the quality characteristics, defined by metrics. Assessment as certification is introduced as a particular process phase. The advisor specified produces advice on produ ...

Results 21 - 30 of 30 Result page: previous 1 **2**

Terms used **matrix DFD** Found **14,797** of **142,983**

Sort results by relevance

Display results expanded form

Save results to a Binder

Search Tips

Open results in a new window

Try an Advanced Search

Try this search in The ACM Guide

Results 1 - 20 of 200 Result page: **1** 2 3 4 5 6 7 8 9 10 next

Best 200 shown Relevance scale

1 Scheduling threads for low space requirement and good locality

Girija J. Narlikar

June 1999 **Proceedings of the eleventh annual ACM symposium on Parallel algorithms and architectures**

Full text available: pdf(1.69 MB) Additional Information: full citation, references, citings, index terms

2 DSS structure and algorithmic transparency in APL

W. E. Cundiff

July 1991 **ACM SIGAPL APL Quote Quad , Proceedings of the international conference on APL '91**, Volume 21 Issue 4

Full text available: pdf(897.81 KB) Additional Information: full citation, abstract, references, index terms

Earlier discussion focused on APL as an executable notation for understanding the inner-workings of dialogue generation and data/model base management in Decision Support Systems (DSS). The present work applies the notion of algorithmic transparency to the broader properties of system structure that connect the technology components of DSS. Using a concise set of idioms, embodying only the control construct of sequence, APL's direct definition form is employed in revealing patterns in the specif ...

3 Support hull: relating the cayley-dixon resultant constructions to the support of a polynomial system

Arthur D. Chtcherba, Deepak Kapur

July 2004 **Proceedings of the 2004 international symposium on Symbolic and algebraic computation**

Full text available: pdf(222.85 KB) Additional Information: full citation, abstract, references, index terms

A geometric concept of the *support hull* of the support of a polynomial was used earlier by the authors for developing a tight upper bound on the size of the Cayley-Dixon resultant matrix for an unmixed polynomial system. The relationship between the support hull and the Cayley-Dixon resultant construction is analyzed in this paper. The support hull is shown to play an important role in the construction and analysis of resultant matrices based on the Cayley-Dixon formulation, similar to th ...

Keywords: dialytic method, dixon resultant formulation, resultant, support, support hull, support-hull interior point, sylvester-type matrices, variable ordering

4 Spreadsheet analysis and design

Boaz Ronen, Michael A Palley, Henry C. Lucas
February 1989 **Communications of the ACM**, Volume 32 Issue 1

Full text available: pdf(860.11 KB) Additional Information: full citation, abstract, references, citings, index terms, review

Although spreadsheet programs and microcomputers have revolutionized information processing in organizations, a significant number of serious errors have been reported through the misuse of this technology. This article discusses several different contexts for the development of spreadsheet models and presents structured design techniques for these models.

5 Software considerations for the "black box" solver FIDISOL for partial differential equations

Willi Schönauer, Eric Schnepf
December 1987 **ACM Transactions on Mathematical Software (TOMS)**, Volume 13 Issue 4

Full text available: pdf(1.32 MB) Additional Information: full citation, abstract, references, citings, index terms, review

FIDISOL is a program package for the solution of nonlinear systems of two-dimensional and three-dimensional elliptic and parabolic partial differential equations (PDEs) with nonlinear boundary conditions (BCs) on the boundaries of a rectangular domain. A finite difference method (FDM) with an arbitrary grid and arbitrary consistency order is used, these are either prescribed by the user or are self-adapted for a given relative tolerance. FIDISOL has been designed to be fully vectorizable on ...

6 Conditions for exact resultants using the Dixon formulation

Arthur D. Chtcherba, Deepak Kapur
July 2000 **Proceedings of the 2000 international symposium on Symbolic and algebraic computation**

Full text available: pdf(236.60 KB) Additional Information: full citation, abstract, references, citings, index terms

A structural criteria on polynomial systems is developed for which the generalized Dixon formulation of multivariate resultants defined by Kapur, Saxena and Yang (1994) computes the resultant exactly. The concept of a Dixon-exact support (the set of exponent vectors of terms appearing in a polynomial system) is introduced so that the Dixon formulation produces the exact resultant for generic unmixed polynomial systems whose support is Dixon-exact. A geometric operation, called direct-sum, o ...

7 Software engineering of virtual worlds

G. Jounghyun Kim, Kyo Chul Kang, Hyejung Kim, Jiyoung Lee
November 1998 **Proceedings of the ACM symposium on Virtual reality software and technology**

Full text available: pdf(1.12 MB) Additional Information: full citation, references, citings, index terms

8 Column: APLUM-APL at the University of Massachusetts

Rick Mayforth
April 1975 **ACM SIGAPL APL Quote Quad**, Volume 6 Issue 1

Full text available: pdf(547.45 KB) Additional Information: full citation, references

9 A reengineering framework for evaluating a financial imaging system

Henry C. Lucas, Donald J. Berndt, Greg Truman
May 1996 **Communications of the ACM**, Volume 39 Issue 5
Full text available: pdf(261.73 KB) Additional Information: full citation, references, citings, index terms

10 Image retrieval: Retrieving 3D shapes based on their appearance
Ryutarou Ohbuchi, Masatoshi Nakazawa, Tsuyoshi Takei
November 2003 **Proceedings of the 5th ACM SIGMM international workshop on Multimedia information retrieval**
Full text available: pdf(559.66 KB) Additional Information: full citation, abstract, references, index terms

In this paper, we propose an algorithm for shape-similarity comparison and retrieval of 3D shapes defined as polygon soup. One of the issues in comparing 3D shapes is the diversity of shape representations used to represent these "3D" shapes. While a solid model is well-defined and is easier to handle, others such as polygon soup poses many problems. In fact, a polygon soup 3D model most often does not define a 3D shape, but merely an illusion of "3D shape-ness" by its collection of independent ...

Keywords: depth map, geometric modeling, polygon soup, polygonal mesh, shape similarity search, three-dimensional models

11 Timing extensions to structured analysis for real time systems
L. Peters
April 1989 **ACM SIGSOFT Software Engineering Notes , Proceedings of the 5th international workshop on Software specification and design**, Volume 14 Issue 3
Full text available: pdf(671.89 KB) Additional Information: full citation, references, citings, index terms

12 Practical safety in flexible access control models
Trent Jaeger, Jonathon E. Tidswell
May 2001 **ACM Transactions on Information and System Security (TISSEC)**, Volume 4 Issue 2
Full text available: pdf(346.47 KB) Additional Information: full citation, abstract, references, citings, index terms

Assurance that an access control configuration will not result in the leakage of a right to an unauthorized principal, called *safety*, is fundamental to ensuring that the most basic of access control policies can be enforced. It has been proven that the safety of an access control configuration cannot be decided for a general access control model, such as Lampson's access matrix, so safety is achieved either through the use of limited access control models or the verification of safety via ...

Keywords: Access control models, authorization mechanisms, role-based access control

13 Evaluation of vendor products: CASE tools as methodology companions
Iris Vessey, Sirkka L. Jarvenpaa, Noam Tractinsky
April 1992 **Communications of the ACM**, Volume 35 Issue 4
Full text available: pdf(1.96 MB) Additional Information: full citation, references, citings, index terms

Keywords: CASE tools, methodology companion, structured analysis and design

14 Visualization '91 workshop report: scientific visualization environments
David M. Butler, Charles Hansen
August 1992 **ACM SIGGRAPH Computer Graphics**, Volume 26 Issue 3
Full text available: pdf(452.66 KB) Additional Information: full citation, abstract, citings, index terms

The Workshop on Scientific Visualization Environments at Visualization '91 was organized with several purposes in mind. First and foremost was to bring together widely dispersed researchers so they could share information in a relatively informal and interactive environment. The organizers believed this would establish working relationships between the participants, which was a second purpose. It was hoped that a workshop could generate a focus and identify important research directions in the f ...

15 Algorithm 315: The damped Taylor's series method for minimizing a sum of squares and for solving systems of nonlinear equations
H. Späth
November 1967 **Communications of the ACM**, Volume 10 Issue 11
Full text available: pdf(482.27 KB) Additional Information: full citation, index terms

16 Algorithm 314: Finding a solution of N functional equations in N unknowns
D. B. Dulley, M. L. V. Pitteway
November 1967 **Communications of the ACM**, Volume 10 Issue 11
Full text available: pdf(482.27 KB) Additional Information: full citation, references, index terms

17 Software engineering: applications, practices tools (SE): A new approach to the BDI agent-based modeling
Chang-Hyun Jo, Guobin Chen, James Choi
March 2004 **Proceedings of the 2004 ACM symposium on Applied computing**
Full text available: pdf(250.23 KB) Additional Information: full citation, abstract, references

Intelligent agents have been regarded as a new notion to build complex software systems. In this paper, we propose an agent-based software development process based on Belief-Desire-Intention (BDI) agent model as a new software development process. The Belief-Desire-Intention (BDI) model has been used as a fundamental ingredient to the new agent-based modeling method. In our agent system proposed here, each agent is made flesh by assigning its own belief, desire and intention. Here we have shown ...

Keywords: CASE tool, agent-based modeling, agent-oriented software engineering

18 An indeterminate constructor for applicative programming
Daniel P. Friedman, David S. Wise
January 1980 **Proceedings of the 7th ACM SIGPLAN-SIGACT symposium on Principles of programming languages**
Full text available: pdf(518.02 KB) Additional Information: full citation, abstract, references, citings

This paper proposes the encapsulization and control of contending parallel processes within data structures. The advantage of embedding the contention within data is that the contention, itself, thereby becomes an object which can be handled by the program at a level above the actions of the processes themselves. This means that an indeterminate behavior, never precisely specified by the programmer or by the input, may be shared in the same way that an argument to a function is shared by every u ...

19 Lightfield acquisition & display: A stereo display prototype with multiple focal distances
Kurt Akeley, Simon J. Watt, Ahna Reza Girshick, Martin S. Banks
August 2004 **ACM Transactions on Graphics (TOG)**, Volume 23 Issue 3
Full text available: pdf(304.43 KB) Additional Information: full citation, abstract, references, index terms

Typical stereo displays provide incorrect focus cues because the light comes from a single surface. We describe a prototype stereo display comprising two independent fixed-viewpoint volumetric displays. Like autostereoscopic volumetric displays, fixed-viewpoint volumetric displays generate near-correct focus cues without tracking eye position, because light comes from sources at the correct focal distances. (In our prototype, from three image planes at different physical distances.) Unlike autos ...

Keywords: graphics hardware, hardware systems, optics, user-interface hardware, virtual reality

20 A CLP(R) system for solving partial differential equations
David S. Homiak
March 1992 **Proceedings of the 1992 ACM/SIGAPP symposium on Applied computing: technological challenges of the 1990's**
Full text available: pdf(1.10 MB) Additional Information: full citation, references, index terms

Results 1 - 20 of 200 Result page: **1** 2 3 4 5 6 7 8 9 10 next

A BLIND SAG-SO-DFD-FS EQUALIZER

G.Picchi
Universita' di Pisa.
Istituto di Elettronica
e Telecomunicazioni.
Pisa, Italy

G.Prati
Universita' di Genova.
Dipartimento di Informatica,
Sistemistica e Telematica.
Genova, Italy

Abstract - Self-orthogonalization (SO) in the discrete frequency domain (DFD) and blind equalization using a stop-and-go (SAG) algorithm are studied for application to fractionally spaced (FS) equalizers. Problems arise when attempting a direct transposition to this case of the results known for synchronous equalizers, e.g. blind convergence is difficult to achieve. This is mainly due to the different properties of the input sequence correlation matrix. An algorithm is proposed that achieves blind convergence by combining the two techniques suitably tailored for fractionally spaced equalizers.

1 - Introduction

Self-orthogonalization (SO) is a fast-converging method used in adaptive equalization to speed-up convergence towards the minimum mean square error (MSE) between the equalizer output and a desired sequence. Since the speed of convergence of the usual gradient algorithm, strongly depends on the eigenvalue spreading of the input sequence correlation matrix, spreading reduction makes convergence faster. Self-orthogonalization reduces the spreading ideally achieving convergence in only one step [1],[2].

Aside from self-orthogonalization, blind equalization has been developed to make convergence possible without resorting to any initial training sequence [3]. Recently a blind Stop-and-Go (SAG) algorithm has been proposed based on stopping adaptation of a normal gradient algorithm whenever the updating term fails a simple reliability test [4].

In this paper the application of the SAG algorithm to fractionally spaced (FS) equalizers is considered. Unfortunately the SAG algorithm is not very effective when directly applied to FS equalizers which is mainly due to the eigenvalue spreading of the input correlation matrix. Self-orthogonalization is shown to be useful to combat the effect. In the following a new blind self-orthogonalizing algorithm in the Discrete Frequency Domain (DFD) is developed for application to fractionally spaced equalizers and its performances are evaluated by computer simulation.

2 - Basic fractionally spaced equalizer

A complex FIR adaptive equalizer with T/2-spaced taps will be considered throughout the paper, being T the Nyquist interval. Let

$$\ldots\ z_{S,k-1}\ z_{F,k-1}\ z_{S,k}\ z_{F,k}\ z_{S,k+1}\ z_{F,k+1}\ \ldots \qquad (1)$$

be the input sequence with T/2-spaced samples. Subscript S indicates synchronous samples, i.e. T-spaced samples that would be present at the input of a synchronous equalizer. Subscript F indicates the corresponding fractional samples following T/2 apart.

An equalizer with 2M taps is shown in Fig.1. Every T seconds an output sample y_k is produced and a desired sample d_k is subracted from y_k to yield the error sample e_k.

Let

$$z_k=[z_{F,k}\ z_{S,k}\ z_{F,k-1}\ z_{S,k-1}\ldots\ z_{F,k-M+1}\ z_{S,k-M+1}]^T \qquad (2)$$

$$c_k=[c_{F,0}\ c_{S,0}\ c_{F,1}\ c_{S,1}\ldots\ c_{F,M-1}\ c_{S,M-1}]_k^T \qquad (3)$$

be the stored samples vector and the tap vector respectively.

For a given c the MSE is expressed by the quadratic form (overbar=complex conjugate)

$$\xi=E\{e_k\bar{e}_k\}=c^T A\bar{c}-c^T\bar{b}-b^T\bar{c}+K \qquad (4)$$

where

This work was supported in part by GTE Telecomunicazioni, Italy

CH2538-7/88/0000-0957 $1.00 © 1988 IEEE

$$A=E\{z_k\,\bar{z}_k^T\};\quad b=E\{\bar{z}_k\,d_k\};\quad K=E\{d_k\,\bar{d}_k\} \qquad (5)$$

Starting from an initial tap vector c_0 the MSE can be recursively minimized by using either the deterministic or the stochastic gradient as follows

$$c_{k+1} = c_k-\alpha(\nabla\varepsilon)_k = c_k-\alpha(\bar{A}\,c_k-b) \qquad (6.1)$$
$$c_{k+1} = c_k-\alpha(\widehat{\nabla\varepsilon})_k = c_k-\alpha\,\bar{z}_k\,e_k \qquad (6.2)$$

where α is the correction step size.

For α suitably small (6.1) and (6.2) converge respectively to

$$c_{opt}=\bar{A}^{-1}\,b \quad \text{and} \quad E\{c_\infty\}=c_{opt} \qquad (7)$$

In the latter case convergence is to be intended in the mean.

3 - Self-orthogonalization

Convergence of algorithms (6) strongly depends on the eigenvalue spreading of matrix A and it can be extremely slow as shown in Fig.2 where a complex FS equalizer for a 256-QAM digital radio link on multipath dispersive channel is considered.

Spreading reduction via time-domain self-orthogonalization is accomplished pre-multiplying the gradient by $\bar{A}^{-1}$. One-step convergence is achieved in the non-stochastic case i.e.

$$c_{k+1}= c_k-\bar{A}^{-1}(\bar{A}\,c_k-b)= \bar{A}^{-1}b= c_{opt} \qquad (8)$$

In the stochastic case the correlation matrix is to be estimated and the estimate inverted. A time domain self-orthogonalizing algorithm derived from (6.2) is then

$$c_{k+1} = c_k - \alpha(\widehat{\bar{A}^{-1}})_k\,z_k\,e_k \qquad (9)$$

where the estimate $(\bar{A}^{-1})_k$ can be computed as follows

$$(\widehat{\bar{A}^{-1}})_k=(\widehat{\bar{A}_k})^{-1}=(1/k+1)\Big(\delta I+\sum_{i=0}^{k} z_i\,\bar{z}_i^T\Big)^{-1} \qquad (10)$$

being δI an inizializaton matrix.

Self-orthogonalization in the discrete frequency domain allows some complexity reduction by exploiting properties of the Discrete Fourier Transform (DFT) and of circulant matrices to turn A into a diagonal matrix for easier inversion. This technique, proposed in [2] for synchronous equalizers, cannot be directly used in the fractional case due to a different form of matrix A. However we show in the following that the same technique can be profitably applied to sub-matrices of a re-ordered version of A.

4 - A DFD self-orthogonalizing algorithm for FS equalizers

Observe that the input sequence $\{z_k\}$ is composed of the sequences $\{z_{S,k}\}$ and $\{z_{F,k}\}$ of the T-spaced synchronous and fractional samples interlaced and that their auto- and cross-correlation samples appear in matrix A arranged as follows

$$A = E\{z_k\,\bar{z}_k^T\} = \qquad (11)$$

$$= \begin{Vmatrix} R_{FF}(0) & R_{FS}(0) & R_{FF}(-1) & R_{FS}(-1) & . \\ R_{SF}(0) & R_{SS}(0) & R_{SF}(-1) & R_{SS}(-1) & . \\ R_{FF}(1) & R_{FS}(1) & R_{FF}(0) & R_{FS}(0) & . \\ R_{SF}(1) & R_{SS}(1) & R_{SF}(0) & R_{SS}(0) & . \\ . & . & . & . & \end{Vmatrix}$$

where for any combination of $X,Y\in\{F,S\}$

$$R_{XY}(m) = E\{z_{X,k}\,\bar{z}_{Y,k+m}\} = \bar{R}_{YX}(-m)$$

is the cross-correlation of processes $\{z_{X,k}\}$ and $\{z_{Y,k}\}$ supposed different from zero only for $|m|\le(G-1)$.

Let us now re-define z_k and c_k taking apart their synchronous and fractional components

$$z_k=[z_{F,k}^T\,|\,z_{S,k}^T]^T;\quad c_k=[c_{F,k}^T\,|\,c_{S,k}^T]^T \qquad (12)$$

where

$$z_{F,k} = [z_{F,k}\;z_{F,k-1}\;\ldots.\;z_{F,k-M+1}]^T$$

$$c_{F,k} = [c_{F,0}\;c_{F,1}\;\ldots.\;c_{F,M-1}]^T_k$$

are the sorted fractional vectors. The synchronous vectors $z_{S,k}$, $c_{S,k}$ are similarly defined.

Using definitions (12) the MSE is still expressed by (4) with A and b defined as follows

$$A = \left\|\begin{array}{c|c} A_{FF} & A_{FS} \\ \hline A_{SF} & A_{SS} \end{array}\right\|;\quad b=[\,b_F^T\,|\,b_S^T\,]^T \qquad (13)$$

where for any combination of $X,Y\in\{F,S\}$

$$A_{XY}=E\{z_{X,k}\,\bar{z}_{Y,k}^T\}=\bar{A}_{XY}^T\;;\quad b_X=E\{\bar{z}_{X,k}\,d_k\}$$

Any sub-matrix A_{XY} in (13) has now the form of the synchronous correlation matrix treated in [2]. From now on definitions (12) are assumed and, following [2] a DFD algorithm is proposed to make the sub-matrices A_{XY} simultaneously diagonal.

Consider a 2N-taps fractionally spaced equalizer with $N\ge M$, and let

$$A' = \left\|\begin{array}{c|c|c|c} A_{FF} & S_{FF1} & A_{FS} & S_{FS1} \\ \hline S_{FF2} & S_{FF3} & S_{FS2} & S_{FS3} \\ \hline A_{SF} & S_{SF1} & A_{SS} & S_{SS1} \\ \hline S_{SF2} & S_{SF3} & S_{SS2} & S_{SS3} \end{array}\right\| = \left\|\begin{array}{c|c} A'_{FF} & A'_{FS} \\ \hline A'_{SF} & A'_{SS} \end{array}\right\| \quad (14)$$

$$b' = [b_F \mid s_F \mid b_S \mid s_S]^T = [b'_F \mid b'_S]^T$$

be arbitrary expansions of A and b in (13). The quadratic form

$$\mathcal{E}(c') = c' A' c' - c' b' - b' c' + K \quad (15)$$

equals the MSE expressed by (4) when c' has the form

$$c' = [c'^T_F \mid 0 \mid c'_S \mid 0]^T \quad (16)$$

that is when c' belongs to the subspace

$$G^T c' = 0 \quad (17)$$

where G^T is the [2(N-M)x2N] matrix

$$G^T = \left\|\begin{array}{c|c|c} 0 & I & 0 \\ \hline 0 & 0 & I \end{array}\right\| \quad (18)$$

Passing to the DFD can now be performed by means of N-point DFT's separately applied to the fractional and synchronous vectors. To this purpose definition of a new (2N)x(2N) transformation matrix is useful

$$W = \left\|\begin{array}{c|c} W_T & 0 \\ \hline 0 & W_T \end{array}\right\| \quad (19)$$

where W_T is the N-point DFT matrix whose (m,n) element is equal to $\exp[-j(2\pi/N)nm]$. Matrix W when applied to z' and c' yields

$$Wz = \left\|\begin{array}{c} W_T z'_F \\ \hline W_T z'_S \end{array}\right\| = N \left\|\begin{array}{c} Z_F \\ \hline Z_S \end{array}\right\|; \quad Wc' = N \left\|\begin{array}{c} C_F \\ \hline C_S \end{array}\right\| \quad (20)$$

It can be shown that non-stochastic minimization of (15) with constraint (17) can be accomplished for any non-singular (2N)x(2N) matrix Φ by

$$\begin{aligned} c'_{k+1} &= c'_k - \alpha \bar{W} P(\Phi\bar{\Phi}^T) W(\bar{A}' c'_k - b) = \\ &= c'_k - \alpha \bar{W} P(\Phi\bar{\Phi}^T)(A_W C_k - B_W) \end{aligned} \quad (21)$$

where

$$P = I - (\Phi\bar{\Phi}^T) WG [G^T \bar{W} (\Phi\bar{\Phi}^T) WG]^{-1} G^T \bar{W} \quad (22)$$

$$C_k = (1/N)\, W c'_k \quad (23)$$

$$B_W = W b' \quad (24)$$

$$A_W = \quad (25)$$

$$= W \bar{A}' W = \left\|\begin{array}{c|c} W_T \bar{A}'_{FF} \bar{W}_T & W_T \bar{A}'_{FS} \bar{W}_T \\ \hline W_T \bar{A}'_{SF} \bar{W}_T & W_T \bar{A}'_{SS} \bar{W}_T \end{array}\right\| = \left\|\begin{array}{c|c} A_{WFF} & A_{WFS} \\ \hline A_{WSF} & A_{WSS} \end{array}\right\|$$

For any choice of Φ, algorithm (21) yields the same final constrained solution c_{opt}

$$c'_{opt} = \bar{A}'^{-1}\{I - G[G^T \bar{A}'^{-1} G]^{-1} G^T \bar{A}'^{-1}\} b' \quad (26)$$

A stochastic gradient algorithm corresponding to (21) and converging in the mean to c'_{opt} is

$$c'_{k+1} = c'_k - \alpha\, \bar{W} P(\Phi\bar{\Phi}^T) W\, \bar{z}'_k\, e_k \quad (27)$$

From (20) and (27) it is apparent that to compute the updating term a N-point DFT is separately applied to $z'_{F,k}$ and $z'_{S,k}$, the resulting vector is deflected by $(\Phi\bar{\Phi}^T)$, projected by P and finally transfomed back to the time domain. To turn (21) into a self-orthogonalizing algorithm $(\Phi\bar{\Phi}^T)$ is to be chosen to satisfy

$$\Phi\bar{\Phi}^T = A_W^{-1} \quad (28)$$

Using (28) and (22) in (21) with α=1 it results $c'_{k+1} = c'_{opt}$ for any c'_k i.e. one-step convergence occurs.

Arbitrary matrices S_{XY1}, S_{XY2}, S_{XY3}, with X,Y$\in${F,S} in (14) can be chosen to simplify the computation of $(\Phi\bar{\Phi}^T)$ in (28). This can be done by making all matrices A'_{XY} circulant so that any $A_{WXY} = W_T \bar{A}'_{XY} \bar{W}_T$ results diagonal [2].

To this goal let us define the (i,j)-th element of any A'_{XY} as follows

$$A'_{XY}(i,j) = \quad (29)$$

$$\begin{cases} R_{XY}(i-j) & \text{for } [(|i-j| \le M-1)\ (|i-j| < N/2)]\ (|i-j| < G) \\ R_{XY}[i-j-\mathrm{sgn}(i-j)\cdot N] & \text{for } (|i-j| \ge M)\ (|i-j| \ge N/2) \\ R_{XY}(N/2) & \text{for } (|i-j| = N/2)\ (N/2 \ge M) \\ 0 & \text{elsewhere} \end{cases}$$

For $M \ge G$ A_{XY} is circulant for $N \ge M+G-1$; for $M < G$ A_{XY} is circulant for $N \ge 2M-1$. In both cases any A_{WXY} is diagonal with elements

$$A_{WXY}(i,i) = N\, S_{\bar{X}\bar{Y}}(\omega_i) \quad (31)$$

where $S_{\bar{X}\bar{Y}}(\omega_i)$ is the cross spectrum (power spectrum for X=Y) of $\{z_{X,k}\}$ and $\{z_{Y,k}\}$ computed at $\omega_i = (2\pi/N)i$.

A stochastic self-orthogonalizing algorithm requires the on-line estimation of $(\Phi\bar{\Phi}^T)=A_W^{-1}$ to be used in (27) and to compute P in (22). Leaving projection to a later discussion, observe that an estimate of any A_{WXY} at time kT can be obtained by means of the Bartlett method of averaging periodograms i.e. [2],[5]

$$\hat{A}_{WXY}=(N^2/k+1)\sum_{i=0}^{k} \text{Diag } \bar{Z}_{X,i}\text{Diag } Z_{Y,i} \qquad (32)$$

An estimate for $(\Phi\bar{\Phi}^T)$ in (28) is then

$$(\hat{\Phi}\hat{\bar{\Phi}}^T)_k = \left\| \begin{array}{c|c} \hat{A}_{WFF} & \hat{A}_{WFS} \\ \hline \hat{A}_{WSF} & \hat{A}_{WSS} \end{array} \right\|^{-1} \qquad (33)$$

The matrix to be inverted in (33) is not diagonal as it resulted in the synchronous case but has only three non-zero diagonals which simplifies the inversion with respect to the time domain [see (10)]. A matrix of this kind has inverse of the same kind i.e.

$$\left\| \begin{array}{c|c} a_0 \; a_1 \; \cdot & b_0 \; b_1 \; \cdot \\ \hline c_0 \; c_1 \; \cdot & d_0 \; d_1 \; \cdot \end{array} \right\|^{-1} = \left\| \begin{array}{c|c} \tilde{a}_0 \; \tilde{a}_1 \; \cdot & \tilde{b}_0 \; \tilde{b}_1 \; \cdot \\ \hline \tilde{c}_0 \; \tilde{c}_1 \; \cdot & \tilde{d}_0 \; \tilde{d}_1 \; \cdot \end{array} \right\| \qquad (34)$$

where the right-hand elements can be computed four at a time by inverting N 2x2 matrices according to the following

$$\left\| \begin{array}{cc} \tilde{a}_i & \tilde{b}_i \\ \tilde{c}_i & \tilde{d}_i \end{array} \right\| = \left\| \begin{array}{cc} a_i & b_i \\ c_i & d_i \end{array} \right\|^{-1} \qquad (35)$$

For N>M an estimate for P should also be computed substituting $(\hat{\Phi}\hat{\bar{\Phi}}^T)_k$ in (22) while no projection is required in the non-expanded case N=M. In this case, conditions for circulancy of A_{WXY} are not met and the estimate (32) is affected by aliasing error.

In spite of this, convergence is still speeded up by the use of the same estimate. Moreover computations of the DFT, via FFT, turn out to be particularly simple when very short equalizers can be used as, for example, in digital radio links affected by multipath. In fact 4-point FFT requires no multiplication.

Performance of algorithm (27) on the channel used in Fig.2 with $(\Phi\bar{\Phi}^T)$ estimated by inverting (32) and used in (22) is shown in Fig.3. In the same figure, performance of a non-expanded equalizer is presented.

5 - Stop-and-go algorithm for blind equalization

When the tap setting of any equalizer is far from optimum, the decided symbols $\hat{d}_k$ are largely incorrect and consequently the error $\hat{e}_k=y_k-\hat{d}_k$ used by the gradient algorithm in the decision-directed mode is unreliable. In fact the gradient algorithm does not converge if not trained by an initial known sequence.

In these conditions the Stop-and-Go algorithm proposed in [4] achieves convergence by stopping adaptation whenever the sign of the output error does not match that of the control error

$$\tilde{e}_k = y_k - \beta \, \text{sgn}(y_k) \qquad (36)$$

where β is real and the sign of y (complex) is to be intended per component. Since only sign comparison is needed, the SAG algorithm results particularly simple.

When directly applied to FS equalizers the algorithm is not as effective as in the synchronous case and blind convergence does not take place. This because multiple sampling increases the eigenvalue dispersion of the input correlation matrix. Blind convergence may be helped by reducing dispersion via self-orthogonalization.

6 - The SAG-SO-DFD-FS equalizer

Combining the stop-and-go algorithm with DFD self-orthogonalization leads to the following algorithm

$$\mathbf{c}'_{k+1} = \mathbf{c}'_k - \alpha\bar{W}(\hat{\Phi}\hat{\bar{\Phi}}^T)_k \, W \, \bar{\mathbf{z}}_k \, e_{B,k} \qquad (37)$$

where M=N is assumed to avoid projection, $(\Phi\bar{\Phi}^T)_k$ is computed by inverting (32) and

$$e_{B,k} = \begin{cases} \hat{e}_k & \text{for sgn } \hat{e}_k=\text{sgn } \tilde{e}_k \\ 0 & \text{for sgn } \hat{e}_k\neq\text{sgn } \tilde{e}_k \end{cases} \qquad (38)$$

Performances of algorithm (37) have been evaluated by computer simulation for a 6-tap FS equalizer (M=3) in a digital radio link environment with modulation format 256-QAM and a multipath dispersive channel on the signature at $MSE=10^{-1}$.

In Figs.4 and 5 the MSE versus the number of iterations is shown for two significant sample curves. It is apparent the different convergence behavior between not using (Fig.4) and using (Fig.5) self-orthogonalization in conjunction with the SAG algorithm.

Actually in all tested situations the use of self-orthogonalization resulted mandatory to achieve fast blind convergence.

7 - Conclusions

A self-orthogonalizing algorithm in the discrete frequency domain has been developed for application to complex fractionally spaced equalizers. Blind equalization based on a Stop-and-Go algorithm has been also considered for the same equalizers.

It has been shown that for fractionally spaced equalizers blind convergence is substantially helped by self-orthogonalization. To this purpose a combination of the previously developed DFD self-orthogonalizing algorithm with the SAG algorithm resulted effective.

8 - References

[1] R. D. Gitlin, F. R. Magee 'Self-Orthogonalizing Adptive Equalization Algorithm' IEEE Trans. on Comm. Vol. COM-23, July 1977.

[2] G.Picchi, G.Prati 'Self-Orthogonalizing Adaptive Equalization in the Discrete Frequency Domain' IEEE Trans. on Comm. Vol. COM-32, No.4, April 1984

[3] A.Benveniste M.Goursat 'Blind Equalizers' IEEE Trans. on Comm. Vol. COM-32, August 1984.

[4] G.Picchi, G.Prati 'Blind Equalization Using a Stop-and-Go Decision-Directed Algorithm' IEEE Trans on Comm. Vol.COM-35. No.9, September 1987

[5] A.V.Oppenheim,R.W.Schafer, Digital Signal Processing Englewood Cliffs,NJ: Prentice-Hall, 1975

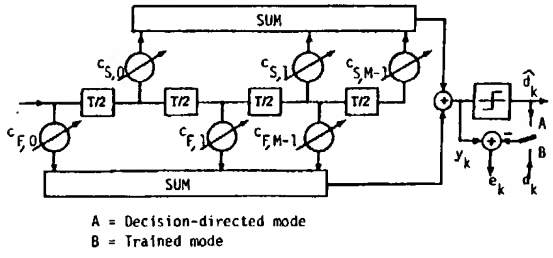


Fig.1 - Basic scheme of the fractionally spaced equalizer.

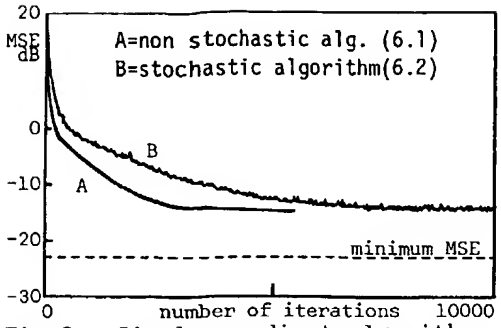


Fig.2 - Simple gradient algorithm. M=4 (8 taps). Trained mode.

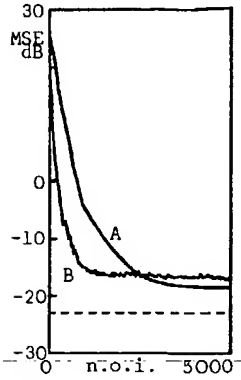


Fig.3 - DFD auto-orthogonalizing algorithm. Stochastic algorithm (27) with (32). Trained mode.
A:Expanded case:M=4, N=12 (24 taps) and (22).
B:Non-expanded case: M=N=4 (8 taps) and no projection.

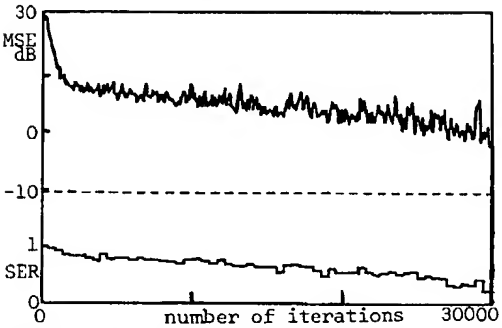


Fig.4 - Blind SAG algorithm: Eq.(6.2) with $e_{B,k}$ from (38) instead of e_k. M=N=6.

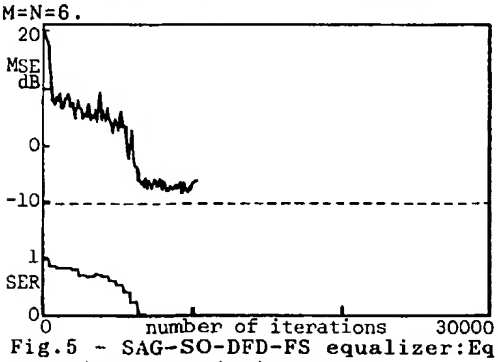


Fig.5 - SAG-SO-DFD-FS equalizer:Eq.(37) with (32) and (38). M=N=6.

Your search matched **5** of **1074479** documents.
A maximum of **500** results are displayed, **15** to a page, sorted by **Relevance Descending** order.

Refine This Search:
You may refine your search by editing the current search expression or enteri new one in the text box.

matrix<and>dfd Search

☐ Check to search within this result set

Results Key:
JNL = Journal or Magazine **CNF** = Conference **STD** = Standard

1 **SVD iterative decision feedback demodulation and detection of code space-time unitary differential modulation**
Steiner, A.; Peleg, M.; Shamai, S.;
Information Theory, IEEE Transactions on , Volume: 49 , Issue: 10 , Oct. 20C
Pages:2648 - 2657

[Abstract] [PDF Full-Text (473 KB)] **IEEE JNL**

2 **A blind Sag-So-DFD-FS equalizer**
Picchi, G.; Prati, G.;
Communications, 1988. ICC 88. Digital Technology - Spanning the Universe. Conference Record. IEEE International Conference on , 12-15 June 1988
Pages:957 - 961 vol.2

[Abstract] [PDF Full-Text (308 KB)] **IEEE CNF**

3 **Minimum mean-squared error multiuser decision-feedback detector DS-CDMA**
Woodward, G.; Ratasuk, R.; Honig, M.L.; Rapajic, P.B.;
Communications, IEEE Transactions on , Volume: 50 , Issue: 12 , Dec. 2002
Pages:2104 - 2112

[Abstract] [PDF Full-Text (576 KB)] **IEEE JNL**

4 **Self-Orthogonalizing Adaptive Equalization in the Discrete Frequenc Domain**
Picchi, G.; Prati, G.;
Communications, IEEE Transactions on [legacy, pre - 1988] , Volume: 32 , Is 4 , Apr 1984
Pages:371 - 379

[Abstract] [PDF Full-Text (1008 KB)] **IEEE JNL**

5 **Speed and accuracy comparison of techniques to solve a binary quadratic programming problem with applications to synchronous CD**
Hasegawa, F.; Luo, J.; Pattipati, K.; Willett, P.;
Decision and Control, 2001. Proceedings of the 40th IEEE Conference on , Vo 5 , 4-7 Dec. 2001
Pages:4051 - 4056 vol.5

[Abstract] [PDF Full-Text (310 KB)] **IEEE CNF**

Home | Log-out | Journals | Conference Proceedings | Standards | Search by Author | Basic Search | Advanced Search | Join IEEE | Web Account | New this week | OPAC Linking Information | Your Feedback | Technical Support | Email Alerting | No Robots Please | Release Notes | IEEE Online Publications | Help | FAQ| Terms | Back to Top

Software Design Center

HOW TO DRAW SSADM DIAGRAMS (cont'd)

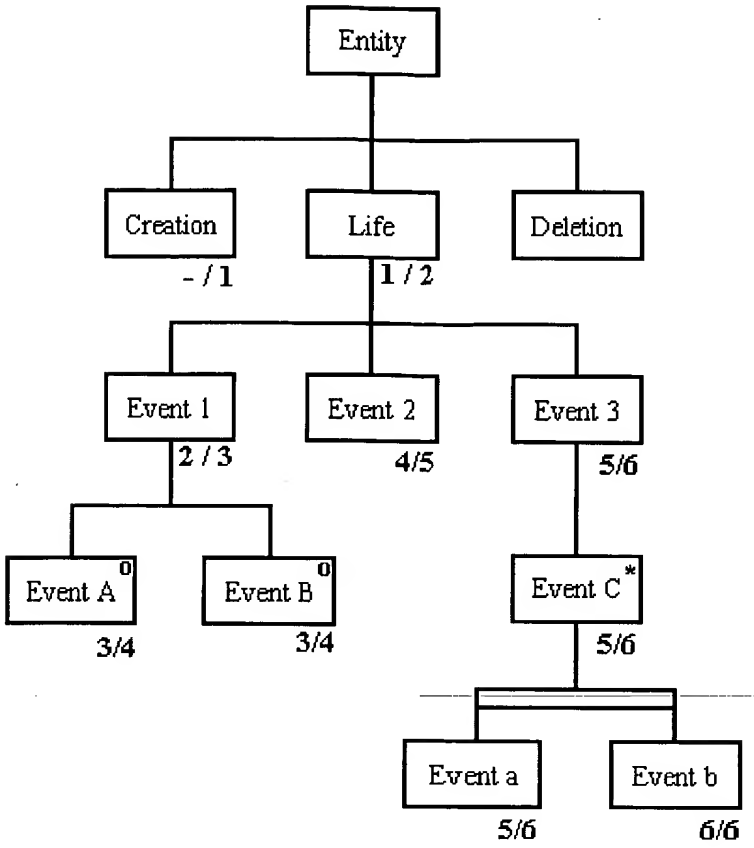
Entity Event Matrix
Draw an entity event matrix to identify the events that affect the system. You can do this easily in Sma

	EVENTS		
ENTITY	Event A	Event B	Event C
Entity 1	X		X
Entity 2		X	X
Entity 3	X	X	X
Entity 4	X	X	

An Entity Event Matrix

To draw an entity event matrix in SmartDraw, use tables. For a tutorial on how to manipulate tables, cli

Entity Life History Diagram
An Entity Life History (ELH) diagram represents the life cycle of entities within the database.

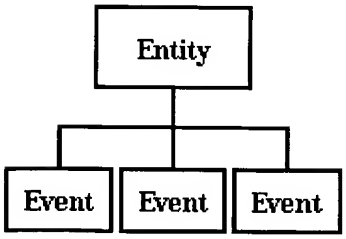


An Entity Life History diagram

Entity Life History (ELH) Notations

Entity
Use a simple rectangle to represent an entit
entity box will be the starting point for your
diagram.

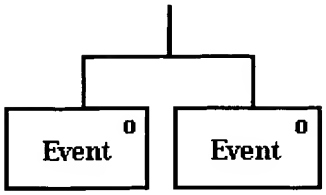
Learn how to add and edit text on an entity.

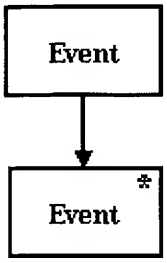


Event
An event creates, modifies, or deletes an
occurance of one or more entity types. The
event should be placed to the left, and at th
height, as the events that are expected to f
it.

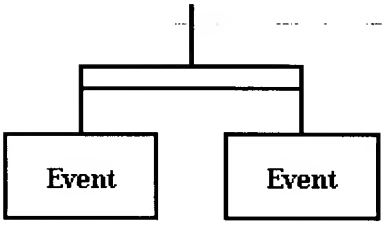
Learn how to use automatic connectors to c
event hierarchies.

Selection
To represent a choice between a number of
alternative events, mark the events with a s
"o" (for option) on the upper right hand corı





Iteration
If an event is repeated, place a small asteri in its upper right hand corner. All events un single node must be of the same type. In ot words, don't mix and match iteration, select and sequence event notations.



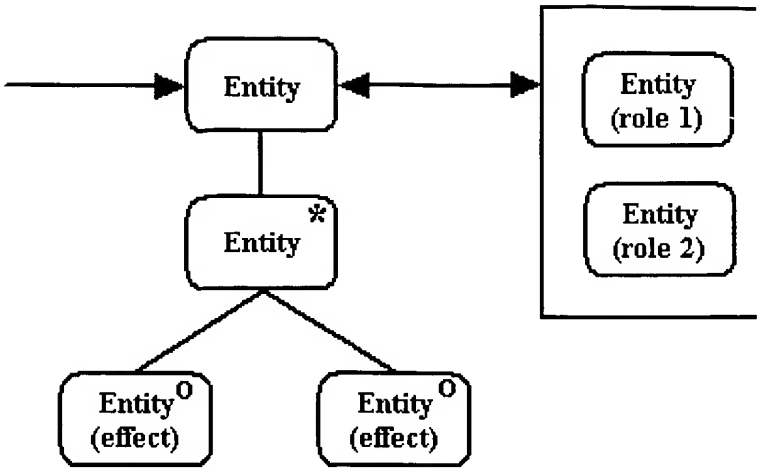
Parallel Structures
To illustrate an event that has no major effe the system, such as a change of an address employee, use a parallel bar to note this ex to the system's normal life.

Quit and Resume
To represent an unusual event (i.e. an empl taking family medical leave), you can use p "quit and resume" events. Each event mark a "Q", can be replaced by an event marked "R."

-/1
1/2

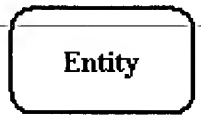
State Indicators
Place state indicators (SIs) under each ever indicate the states that precede and follow i a slash to divide the states before and after event takes place.

Effect Correspondence Model
Effect Correspondence Diagrams (ECD) illustrate all the entities affected by a given event.



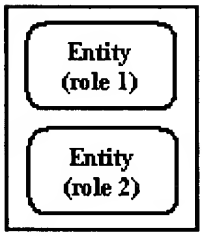
An Effect Correspondence Diagram

Effect Correspondence Diagram (ECD) Notations

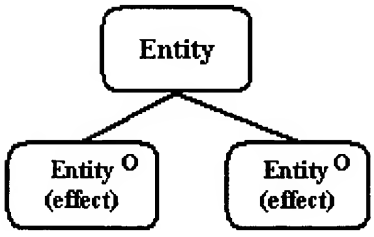


Entity
Use a rounded rectangle to represent a entity.

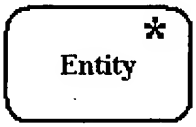
Learn how to add and edit text on an er



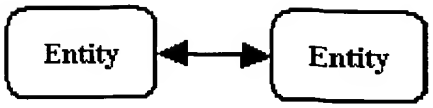
Simultaneous Effects
When an effect forces the entity to take multiple roles, encapsulate these roles i rectangle.



Optional Effects
Mark entities with a small "o" to identify effect that forces the entity to behave i or more mutually exclusive ways.

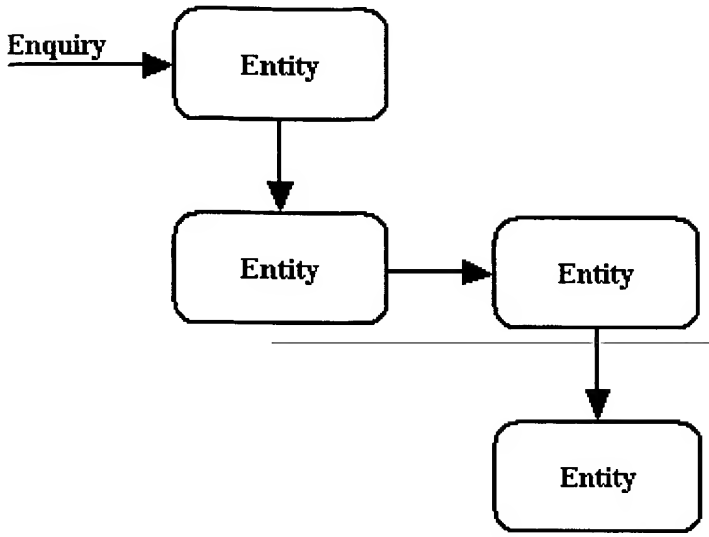


Iteration
Use an asterisk (*), to illustrate an enti is affected multiple times.



One-to-one Correspondence
If two entities are updated at the same link them with a double-headed arrow.

Enquiry Access Paths (EAPs)
Enquiry Access Paths (EAP) define a route through the Logical Data Model to satisfy a particular enquiry crow's foot relationships and relationship labels and replace them with EAP arrows.



An Enquire Access Path Diagram

To draw an EAP in SmartDraw, use a simplified LDM with arrows indicating the direction of the enquiry.

Return to top « Previous Page « 1 2

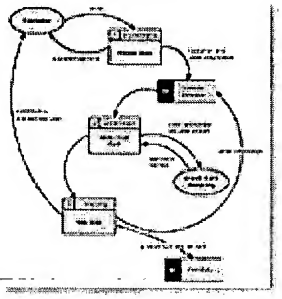
Sources of Information

- **SSADM**
  - SSADM Reference Manual, 1986(Version 3), 1990 (Version 4), NCC
  - SSADM, Application and Context, 1991 (2nd Edn) , by Downs, Clare, & Coe, pub Prentice-Hall
  - SSADM, A Practical Approach, 1990, (Version 4 book due 1995) by Ashworth/Slater & Goodland, pub McGraw-Hill
  - Practical SSADM V4, Philip L. Weaver, Pitman Publishing, 1993
  - SSADM Version 4: A User's Guide, (2nd Ed), Malcom Eva, McGraw-Hill, 1994

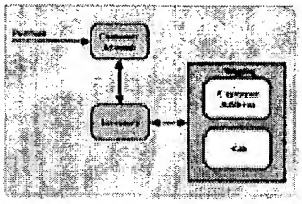
Software Design - SSADM Diagrams

Created using the SmartDraw Software Design Collection

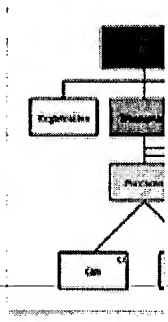
SSADM-Style Data Flow Diagram
Online Ordering System
Click to enlarge



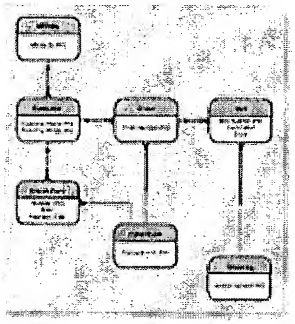
Effect Correspondence Diagram
Purchase
Click to enlarge



Entity Life History
Customer Account
Click to enlarge



Logical Data Model (LDM)
Online Ordering System
Click to enlarge



Learn all about software design diagrams at the SmartDraw Software Design Center

Business Process Modelling Tools (By Technique)

Techniques:

- IDEF
- Petri-net (CPN)
- Yourdon (DFD)
- UML
- Booch
- Rumbaugh
- Shlaer-Mellor
- Coad/Yourdon
- Martin
- Chen
- SSADM
- Bachman
- Gantt
- Object Oriented
- Soft Systems
- Meta Modelling
- Flow Chart
- ABC
- Workflow
- Simulation

Tools that support IDEF

- 4Keeps
- AI0 WIN
- BPWin
- Business Object Modelling Workbench
- CORE
- Design IDEF
- Design Leverage
- IDEF Tools
- Popkins Systems Architect
- Pro CAP Pro SIM
- Process Maker
- SA/BPR Professional
- Workflow Modeler

Tools that support Petri-net (CPN)

- Design CPN
- INCOME
- PACE
- Process Maker
- Process Weaver

Tools that support Yourdon (DFD)

- 4Keeps
- BONAPART
- GRADE
- Paradigm Plus
- Popkins Systems Architect
- Softwarethrough Pictures SE
- With Class 98

Tools that support UML

- 4Keeps
- Class Designer
- COOLJex
- Innovator
- j-vision
- Javision
- LOREx2 for Java
- Magic Draw UML
- Object Plant
- Objecteering
- Paradigm Plus
- Pragmatica
- Real-time Studio
- Rhapsody
- SDT
- Soft Modeler Business
- Softwarethrough Pictures UML
- Together C
- Together J
- Visual UML
- With Class 98

Tools that support Booch

- 4Keeps
- Class Designer
- Paradigm Plus
- Softwarethrough Pictures Booch
- With Class 98

Tools that support Rumbaugh

- 4Keeps
- Paradigm Plus
- Select Enterprise

Tools that support Shlaer-Mellor

- 4Keeps
- Bridge Point Automation Tools
- Paradigm Plus
- SES/objectbench
- With Class 98

Tools that support Coad/Yourdon

- 4Keeps
- Paradigm Plus
- Together C
- With Class 98

Tools that support Martin

- 4Keeps
- Kappa
- Object Management Workbench OMWtm
- Paradigm Plus

Tools that support Chen

- 4Keeps
- Softwarethrough Pictures IM

Tools that support SSADM

- 4Keeps
- SSADM

Tools that support Bachman

- Bachman Analyst

Tools that support Gantt

- ABT Project Workbench
- PFTamptrade
- Project Scheduler7
- Team Flow
- Workflow.BPR

Tools that support Object Oriented

- BRWin A&D
- Class Designer
- ICONIXOOAamp D Power Tools
- Kappa
- Live Analyst
- Mac Aamp D
- Meta Edit
- Object GEODE
- Object Management Workbench OMWtm
- Object Modeler
- Object Team
- OODesigner
- Paradigm Plus
- Process Flo
- Quick CRC
- radica
- Rhapsody
- SA/Object Architect
- Select Enterprise
- System Architect
- The Electronic Workforce

Tools that support Soft Systems

Tools that support Meta Modelling

- AWD and Workflow Analyzer
- Meta Edit
- Meta Edit Method Workbench
- Meta Edit Personal
- Metaphase 2.0
- Metaview FOLDERS
- Power Designer
- Process Maker
- Softwarethrough Pictures Booch
- Softwarethrough Pictures OMT
- Work Flow Analyzer

Tools that support Flow Chart

- ABC Flow Charter 4.0
- ABC Graphics Suite
- ABT Project Workbench
- AWD and Workflow Analyzer
- Bench Marker Plus
- BPM
- Business Object Modelling Workbench
- Cap Web-Flow
- CLEAR

- COI-Business Flow
- CORE
- COSA
- CSEWorkflow 5.0
- Docu Flow
- EPM Suite
- Flow Maker
- Flow Path
- Flow PATH IMAGEWorks
- Flowcharter
- Flowmark
- Form Flow
- Free Flow
- GOOFEE Diagrammer
- IBMBusiness Process Modeler
- Jet Form Server
- MAXIM
- Net Prophet
- OCTOFlow
- Optix Workflow
- PAVONE Group Flow
- PFTamptrade
- Power Flow
- Power Flow Team Flow Process Wise
- Pro Model
- Process Charter
- Process Maker
- RKB Work Frame
- SA/BPR Professional
- Smart Flow 98
- Vectus
- Visual Thought
- Work Flow Analyzer
- Work FLOW SQL
- Work Flow.2000
- Work Flow.2020
- Work Xpert
- Workflow FONT FACESymbolmiddot FONTBPR
- Workflow Modeler
- Workflow.BPR

Tools that support ABC

- AI0 WIN
- Bench Marker Plus
- Easy ABCQuick
- Extend BPR
- TI BDF
- TOP-IX

Tools that support Workflow

- 1View Workflow
- ABSI-Docs
- Action Request System
- Action Workflow Analyst
- Action Workflow Application Builder
- Action Workflow Enterprise Series
- Action Workflow Workflow Manager
- ARIS
- ATIWorkflow Manager
- Automated Work Distributor AWD
- AWD and Workflow Analyzer
- Beyond Mail
- BONAPART
- Business Object Modelling Workbench
- Cap Web-Flow
- CMSWorkflow
- COI-Business Flow
- Computron Workflow
- COOL
- COSA
- CSEWorkflow 5.0
- Designer2000
- Docu Flow
- Document Manager
- Documentrix Workmanager
- EDI36
- EDI38
- EDI400
- EDIe QMail
- Engineering Workflow System
- Ensemble
- Enterprise Analyst
- Entire Workflow
- EPM Suite
- Extend BPR
- Fabasoft Components
- File Net Work Flow
- Flo Ware
- Flow Maker
- Flow Man
- Flow PATH IMAGEWorks
- FLOWBuilder
- Flowmark
- Form Flow
- FORO
- FYI
- FYI Workflow
- Group Wise

- IBIsys
- IBMBusiness Process Modeler
- IBS Workflow Manager
- Image Fast
- Image Master
- In Concert
- Inter Office
- Jet Form Server
- Key Workgroup
- Keyflow
- Life FLOW
- Link Works Team Links
- Linkworks
- Livelink Intranet
- MAVIM 3
- Memo
- Message Driven processor MDp
- Metaphase 2.0
- Metaview FOLDERS
- METEOR
- METIS
- Navigator 2000Document Management Systems Navigato
- Navigator 2000Workflow
- Nova Manage
- OCTOFlow
- ODMS
- Office.IQ
- Open Image
- OPENworkflow
- Optix Workflow
- PAVONE Group Flow
- Plexus Flo Ware
- Power Flow
- Power Flow Team Flow Process Wise
- Power Work
- Process Flo
- Process IT
- Protos
- radica
- Regatta
- Route Builder Omni Desk
- SAP Business Workflow
- Smart Flow 98
- Smart Stream.
- SPARKS G2
- Struct Ware
- The Vantive System
- Ultimus
- Viewstar
- Viewstar Workbench
- Win Work

- Wizdom Works
- Work Fast
- Work Flow Analyzer
- Work MAN
- Work Party
- Work Xpert
- Workflow Analyzer
- Workflow FONT FACESymbolmiddot FONTBPR
- Workflow.BPR
- WORKlogik TM
- World Wide Web Flow W4
- XWorkflow

Tools that support Simulation

- AWD and Workflow Analyzer
- BONAPART
- BPSimulator Template
- Business Object Modelling Workbench
- Business Process Analyzer
- Bwise Toolkit
- CABRE -Witness
- Cinderella SDL
- CLEAR
- Clear Process
- Design CPN
- Design Leverage
- Dress Rehearsal
- EPM Suite
- First STEP
- Flowcharter
- GRADE
- HITSoft BIZ
- HOCUS
- i-think
- Ithink
- Live Analyst
- METIS
- Micro SAINT
- Object GEODE
- Optima
- Optima Express
- Oracle Process Manager
- PACE
- PAVONE Group Flow
- Powersim
- Pro Model
- Pro Model 2.0
- Process Charter
- Prophesy

- PROSIM Process Modeling Software
- Quick CRC
- RDD-100
- SES/Workbench
- SIMAN amp ARENA
- SIMPROCESS
- Soft Modeler Business
- SPARKS G2
- Statemate Magnum
- Struct Ware
- Surveywin
- Taylor II
- TI BDF
- Vectus
- Vensim
- Witness
- Workflow Analyzer
- Workflow FONT FACESymbolmiddot FONTBPR
- Workflow.BPR

Google Web Images Groups News Froogle more »
SSADM Search Advanced Search Preferences

Web Results **1** - **10** of about **23,700** for **SSADM** [definition]. (**0.14** seconds)

Introduction to Methodologies & **SSADM** Version 4
Introduction to Methodologies and **SSADM**. ... Home Page. What is **SSADM**? **SSADM** (Structured Systems Analysis and Design Methodology) is a methodology (Def. ...
www.comp.glam.ac.uk/pages/ staff/tdhutchings/chapter4.html - 23k - Cached - Similar pages

SSADM - an Introduction
SSADM - an Introduction. 1/20/99. Click here to start. Table of Contents. **SSADM** - an Introduction. Structured Methods. Some claims for Structured Methods. ...
www.dcs.bbk.ac.uk/~steve/1/ - 3k - Cached - Similar pages

Select **SSADM** completely and accurately describes all application ...
... select **ssadm**, ... Select **SSADM** also offers flexible facilities that encourage managers to customize the methodology to satisfy the demands of specific projects. ...
www.selectbs.com/products/products/select_**ssadm**.htm - 39k - Cached - Similar pages

Learn about the six SSADM4 stages, Logical Data Models, and Data ...
Learn about the six **SSADM** stages, Logical Data Models, and Data Flow Diagrams. ... Software Design Center HOW TO DRAW **SSADM** DIAGRAMS. What are **SSADM** Diagrams? ...
www.smartdraw.com/resources/centers/software/**ssadm**.htm - 33k - Cached - Similar pages

Structured System Analysis and Design Method (**SSADM**) Examples ...
Look at cool **SSADM** diagrams created in SmartDraw. Download your FREE trial copy today. SmartDraw, Search. ... ERDs. Data Flow Diagrams. **SSADM** Diagrams. Booch Diagrams ...
www.smartdraw.com/resources/examples/software/**ssadm**.htm - 23k - Cached - Similar pages
[More results from www.smartdraw.com]

What is **SSADM** - a definition from the leading computer technical ...
SSADM (Structured Systems Analysis Design Method) is a widely-used computer application development method in the UK, where its use is often specified as a ...
whatis.techtarget.com/definition/ 0,289893,sid9_gci213458,00.html - 35k - Cached - Similar pages

International **SSADM** Users Group
International **SSADM** Users Group. The International **SSADM** Users Group has ceased to exist and as a result this Web site has been terminated. ...
www.cscs.wmin.ac.uk/~**ssadm**/ - 2k - Cached - Similar pages

Structured Systems Analysis and Design Methodology - Wikipedia
... (Redirected from **SSADM**). Structured Systems Analysis and Design Methodology (**SSADM**) is a systems approach to the analysis and design of information systems. ...
en.wikipedia.org/wiki/SSADM - 11k - Cached - Similar pages

SSADM

... **SSADM**. ... **SSADM** is a full life cycle CASE tool utilising the Structured Systems Analysis

and Design Method and supporting the latest Version 4+ of the method. ...
is.twi.tudelft.nl/~hommes/tl1822.html - 2k - Cached - Similar pages

Model Systems: **SSADM**

SSADM. ... Model Systems and **SSADM**. **SSADM**. The Structured Systems Analysis and Design Method (**SSADM**) was developed by LBMS in 1980/81 for ...
www.modelsys.com/ms**ssadm**.htm - 7k - Cached - Similar pages

Goooooooooogle ▶
Result Page: 1 2 3 4 5 6 7 8 9 10 **Next**

SSADM Search

Search within results | Language Tools | Search Tips | Dissatisfied? Help us improve

Google Home - Advertising Programs - Business Solutions - About Google

SSADM Version 4: A User's Guide

Malcom Eva

Hardcover - 2nd ed, May 1994

A new copy is not available from Barnes & Noble.com at this time.

Search For Used Copies
Used copies of this title may be offered by our network of book dealers.

Product Details:

ISBN: 0077079590
Format: Hardcover, 380pp
Pub. Date: May 1994
Publisher: McGraw-Hill Companies, The
Edition Description: 2nd ed
Edition Number: 2
Series: McGraw-Hill International Series in Soft

ABOUT THE BOOK

SSADM Version 4: A User's Guide

Customer Reviews

- Write your own online review!

SSADM - an Introduction

1/20/99

Click here to start

Author: Mike Goodland/ Karel Riha

Table of Contents

Physical Design

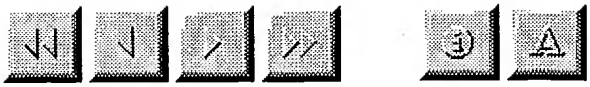
Construction & Testing

Transition

Production, Maintenance and Review

Costs associated with the SLC

Sources of Information



SSADM - an Introduction

- **Structured Methods**
  - Characteristics and Claims
  - History
- **SSADM**
  - History of SSADM
  - Components, Inputs and Outputs
  - Techniques
  - Documentation and CASE tools
- **SSADM in the Systems Life Cycle**
  - Brief discussion of each stage
  - Costs and Problems
- **Sources of Information**

Structured Methods

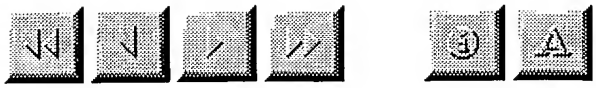
- **Characteristics of Structured Methods**
  - used for requirements specification, systems design
  - structure a project into small, well-defined activities
  - specify the sequence and interaction of these activities
  - use diagrammatic and other modelling techniques:
  - give a precise (structured) definition
  - are understandable by both users (clients) and developers

Some claims for Structured Methods

- reduce life cycle development costs through improved analysis and design
- improve quality of systems delivered
- improve project management, planning and control
- more effective use of inexperienced staff
- improve communication
  - user - analyst
  - analyst - designer
  - designer - programmer
  - analyst - analyst, designer - designer
- self documenting

History and examples

- Yourdon (Structured Design) - late 1970s
- DeMarco (Structured Analysis) - late 1970s
- Merise (France) - late 1970s
- Information Engineering (Finkelstein and Martin)- late 1970s / early 1980s
- Structured Systems Analysis and Design Method (SSADM also LSDM) - 1980



History of SSADM

- 1980 Central Computer and Telecommunications Agency (CCTA) evaluate analysis and design methods
- 1981 LBMS method chosen from shortlist of five
- 1983 SSADM made mandatory for all new information system developments
- 1984 Version 2 of SSADM released
- 1986 Version 3 of SSADM released, adopted by NCC
- 1988 SSADM Certificate of Proficiency launched, SSADM promoted as 'open' standard
- 1989 Moves towards Euromethod, launch of CASE products certification scheme
- 1990 Version 4 launched
- 1993 SSADM V4 Standard and Tools Conformance Scheme Launched
- 1995 SSADM V4+ anounced, V4.2 launched

Intro to SSADM 5

Components of SSADM

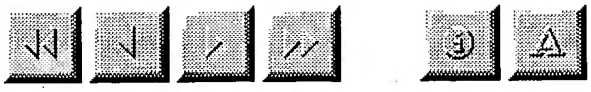
- **Structures**
  - define the frameworks of activities, steps and stages and their inputs and outputs
- **Techniques**
  - define how the activities are performed
- **Documentation**
  - define how the products of the activities, steps and stages are presented

INPUTS to and OUTPUTS from SSADM

- **Inputs**
  - Project Initiation Document
    - » Business Case
    - » Terms of reference
    - » Project boundaries
    - » Project management
  - Reports from Previous Studies
    - » Feasibility Report
    - » IS Strategy Report
- **Outputs**
  - Program Specifications
  - File / DB Specifications
  - User Procedure Specifications
  - Operations Procedure Specifications

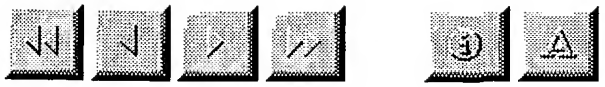
Size and application areas

- **Project size:**
  - Small 1-2 persons, < 1 man year
  - Medium 4 - 10 persons, 1 to 20 man years
  - Large
- **Implementation media:**
  - Micros, Minis, Mainframes, Distributed and Replicated systems
  - COBOL and other 3GLs, 4GLs, application packages, turnkey developments
- **Start point has been:**
  - No existing system
  - Manual system or partially automated system
  - Maintenance of existing systems



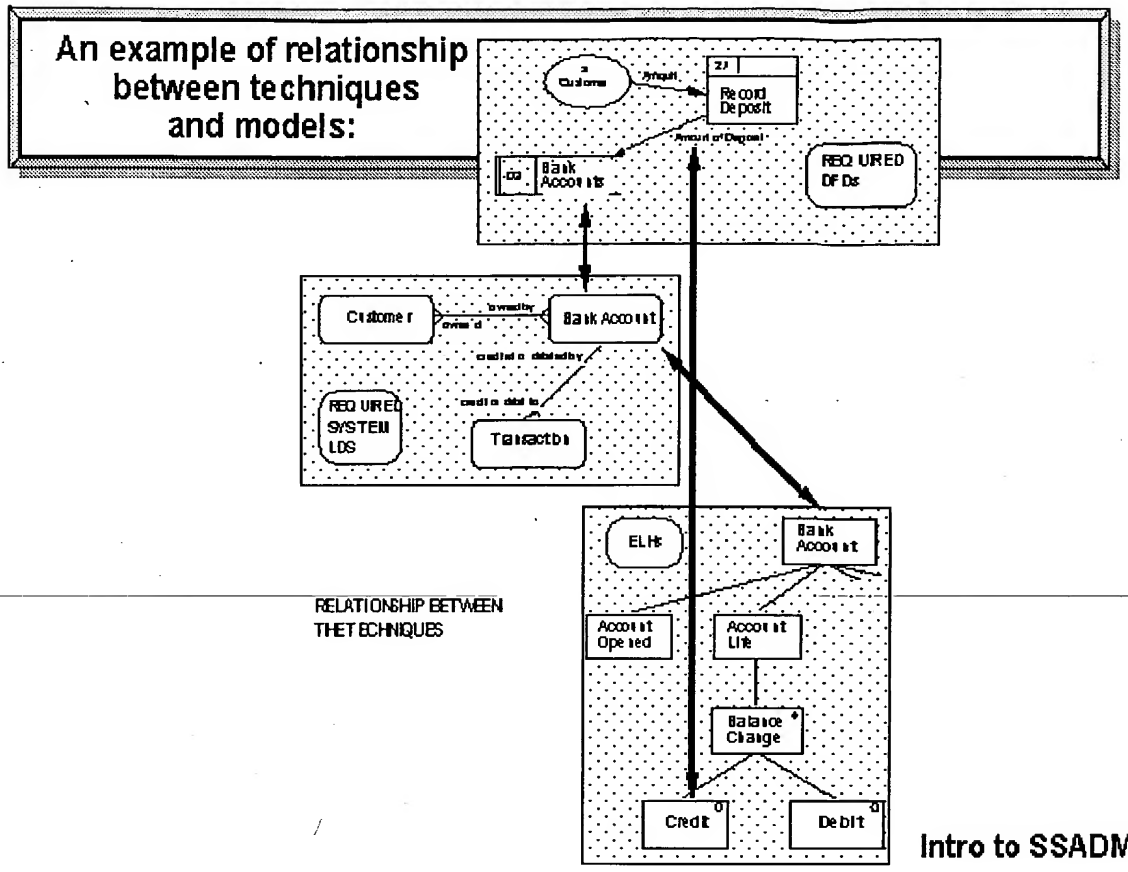
SSADM Techniques and Models

- Logical Data Models
- Data Flow Models
- Requirements Definition
- Function Definition
- Specification Prototyping
- Relational Data Analysis
- Entity/Event Modelling (Entity Life Histories and Effect Correspondence Diagrams)
- Business and Technical Options
- Dialogue Design
- Update and Enquiry Process Models
- Physical Data Design
- Physical Process Specification
- Physical Design Control



Complementary techniques

- Quality Assurance Reviews
- Formal Documentation
- Project Control Methods
- Use of CASE Tools

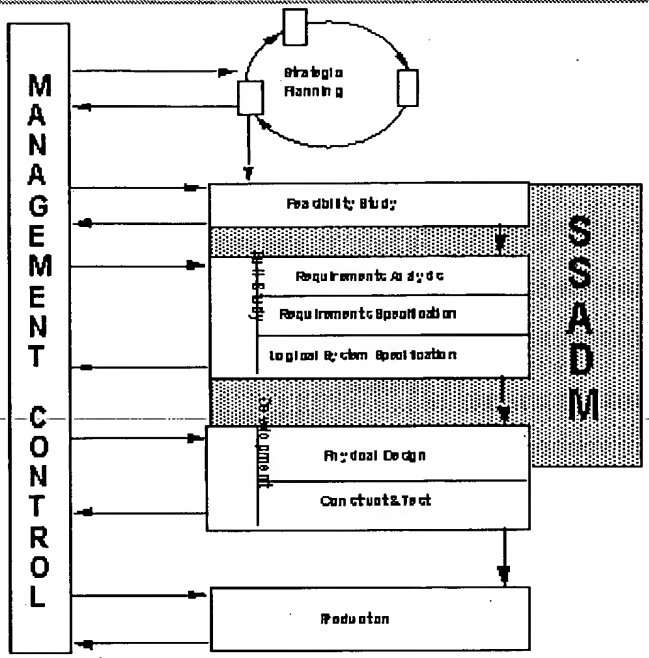


Slide 11 of 24

Documentation and CASE tools

- **Different kinds of documents produced:**
  - diagrams
  - forms
  - matrices
  - narrative reports
- **Many projects now using Computer Aided Systems Engineering (CASE tools) for:**
  - producing high quality documentation
  - enabling rapid amendment of diagrams and other structured information
  - checking consistency and completeness

SSADM in the Systems Life Cycle

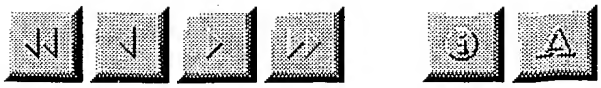


Intro to SSADM 13

Slide 13 of 24

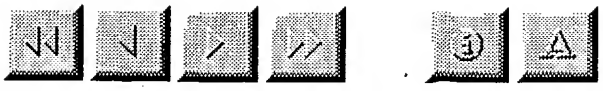
Strategic Information Systems Planning

- **Becoming very popular:**
  - high investment in IT needs control
  - Info Sys very important to competitive position
  - Many methods and consultancies on offer
  - End products of Strategic Information Systems (IS) Planning usually:
    - » analysis of present position (problems, costs, opportunities)
    - » recommendations for future ISs and enhancements
    - » total plan for all IS development
    - » outline plans and scoping for each IS project



Feasibility Study

- **Is the project**
  - technically possible?
  - financially and socially justified?
  - acceptable to the organization?
- **Requires some analysis and design**

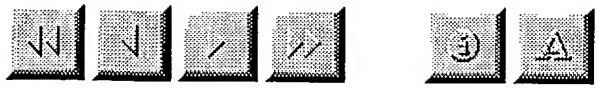


Requirements Analysis and Specification (1)

- **Analysis of current system**
  - operations
  - problems
  - volumes and costs
- **Specification of requirements for a new system**
  - the what rather than the how
  - functions
  - data
  - inputs and outputs

Requirements Analysis and Specification (2)

- Information collected by
  - interviews
  - questionnaires
  - from previous studies
  - record searching
  - observation
- System (both current and future) described by
  - narrative
  - system models (structured information)

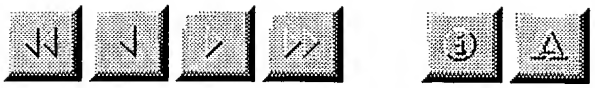


Logical System Specification (Business Systems Design)

- broad specification from systems analysis
- technical solutions to the requirements are evaluated
- detailed logical (non-technical) design developed which shows clearly how the new system will operate within the business
- narrative and system models used

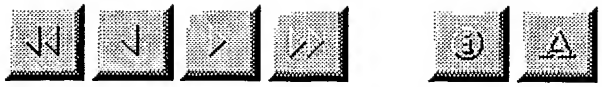
Physical Design

- **Logical design converted to a physical (technical) one**
  - File specifications or database definitions
  - Program specifications
  - Screen and report specifications



Construction & Testing

- Programming
- Assembly
- Testing
- Many projects now using 4GLs and building prototypes earlier in the SLC

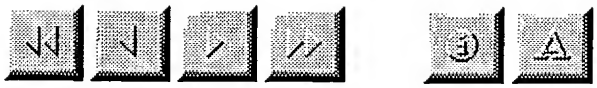


Transition

- **from operating the old system to operating the new**
- **Involves:**
  - **installation of equipment**
  - **conversion of old system data to the formats required by the new**
  - **training of and handover to users**

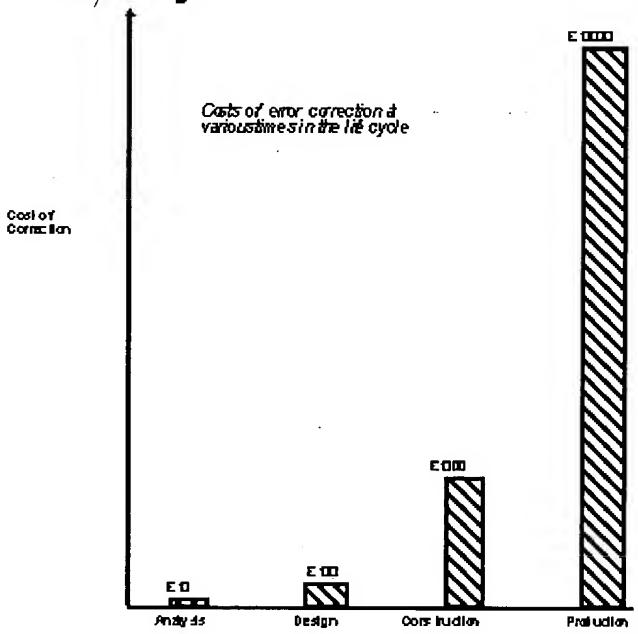
Production, Maintenance and Review

- when the system is operating and producing the required information
- Maintenance required throughout the production phase:
  - correction of errors
  - adaptation to new software and hardware releases
  - enhancements
- Review to show
  - How well it has met the requirements and objectives set for it?
  - Does it continue to meet the users requirements?
- These enhancements and reviews may lead into further system studies



Costs associated with the SLC

- **Maintenance absorbs ca. 70% of total systems life cycle costs.**



Intro to SSADM 23

Sources of Information

- **SSADM**
  - SSADM Reference Manual, 1986(Version 3), 1990 (Version 4), NCC
  - SSADM, Application and Context, 1991 (2nd Edn) , by Downs, Clare, & Coe, pub Prentice-Hall
  - SSADM, A Practical Approach, 1990, (Version 4 book due 1995) by Ashworth/Slater & Goodland, pub McGraw-Hill
  - Practical SSADM V4, Philip L. Weaver, Pitman Publishing, 1993
  - SSADM Version 4: A User's Guide, (2nd Ed), Malcom Eva, McGraw-Hill, 1994